Initial analysis of Ryugu samples

Shogo Tachibana[1]
[1]*Department of Natural History Sciences, Hokkaido University*

Hayabusa2 spacecraft will bring back surface samples of a near-Earth C-type asteroid Ryugu late 2020. The Hayabusa2 returned-samples will be classified into (1) millimeter-sized coarse grains, (2) <100 μm-sized fine grains, and (3) volatiles components that will be extracted from the sample container prior to its opening [1–3]. After the first characterization at the curation facility of Institute of Space and Astronautical Science (ISAS), JAXA, the initial analysis of Ryugu samples will be done by the Hayabusa2 mission to maximize the scientific achievement of the project for 12 months to prove the potential of the samples.

Initial analysis of returned samples will focus on revealing the formation and evolution of Ryugu in the early Solar System. The scientific objectives of sample analysis are listed in the following table, which covers from the presolar history to the current geological activity of the near-Earth asteroid [1].

The initial analysis team will consist of six sub-teams for 1) chemistry (elements and isotopes), 2) petrology and mineralogy of coarse grains (mm-sized grains), 3) petrology and mineralogy of fine grains (<100 μm-sized grains), 4) volatiles, 5) macromolecular organics (insoluble organic matter), and 6) organic molecules (soluble organic matter).

Each sub-team will be an international analysis team led by a researcher who can have a research base in Japan at least a year before the delivery of the samples (the end of 2020) and throughout the initial analysis phase (2021–2022). The sub-team leaders will make an analysis and work flow plan in their sub-teams with the IAT members to make the best effort in fulfilling the scientific goals of the mission through integration of analytical results from each sub-team and on- site remote-sensing data.

The Hayabusa2 project opened a call for nomination of the sub-team leaders in October 2016. All the nominations were thoroughly reviewed by the Hayabusa2 Sample Allocation Committee (HSAC). The HSAC recommended candidates of the sub-team leaders to the Hayabusa2 Joint Science Team (HJST) for approval. The initial analysis plan of Ryugu samples will be presented with the names of approved sub-team leaders at the symposium.

References

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